

WHAT IS CLAIMED IS:

1                   1.       A system for synchronizing a public switched telephone network  
2 (PSTN) clock and a digital subscriber line (DSL) clock, comprising:  
3                   a PSTN interface coupled to transmit and receive voiceband samples;  
4                   a data DSL transceiver coupled to modulate and demodulate data to and from  
5 DSL samples;  
6                   a synchronization circuit coupled to synchronize said voiceband samples and  
7 said DSL samples; and  
8                   a converter circuit coupled to convert the synchronized voiceband samples and  
9 the synchronized DSL samples between analog and digital formats.

1                   2.       The system of claim 1, wherein said converter circuit converts said  
2 voiceband samples and said DSL samples from a digital format to an analog format for  
3 transmitting a combined voiceband and data signal.

1                   3.       The system of claim 1, wherein said converter circuit converts said  
2 voiceband samples and said DSL samples from an analog format to a digital format for  
3 receiving a combined voiceband and data signal.

1                   4.       The system of claim 1, wherein said synchronization circuit  
2 synchronizes said voiceband samples with said DSL samples and comprises:  
3                   a second converter circuit coupled to convert said voiceband samples from a  
4 companded format to a linear format;  
5                   an upsampler circuit coupled to increase a frequency of said voiceband  
6 samples from  $(8 + \delta)$  kHz to  $(8 + \delta) \cdot M$  kHz; and  
7                   a re-timer circuit coupled to synchronize the upsampled voiceband samples  
8 with said DSL samples.

1                   5.       The system of claim 1, wherein said synchronization circuit  
2 synchronizes said voiceband samples with said PSTN clock and comprises:  
3                   a re-timer circuit coupled to synchronize upsampled voiceband samples with  
4 said PSTN clock;  
5                   a downsampler circuit coupled to reduce a frequency of said upsampled  
6 voiceband samples from  $(8 + \delta) \cdot M$  kHz to  $(8 + \delta)$  kHz; and

7 a second converter circuit coupled to convert the downsampled voiceband  
8 samples from a linear format to a companded format.

1 6. The system of claim 1, wherein said synchronization circuit  
2 synchronizes said voiceband samples with said DSL samples and comprises:  
3 a phase offset detection circuit coupled to detect a phase difference between  
4 said PSTN clock and said DSL clock;  
5 a phase interpolation circuit coupled to adjust said voiceband samples  
6 according to the detected phase difference; and  
7 a multiplexer circuit coupled to multiplex said DSL samples with the adjusted  
8 voiceband samples for transmission.

1 7. The system of claim 1, wherein said synchronization circuit  
2 synchronizes said voiceband samples with said DSL samples and comprises:  
3 a phase offset detection circuit coupled to detect a phase difference between  
4 said PSTN clock and said DSL clock;  
5 a demultiplexer circuit coupled to demultiplex said voiceband samples and  
6 said DSL samples from a received signal; and  
7 a phase interpolation circuit coupled to adjust said voiceband samples  
8 according to the detected phase difference.

1 8. A method of synchronizing a public switched telephone network  
2 (PSTN) clock and a digital subscriber line (DSL) clock, comprising the acts of:  
3 upsampling a voiceband signal, to increase said voiceband signal to a  
4 frequency comparable with a data signal; and  
5 sample slipping one of said voiceband signal and said data signal, to  
6 synchronize said voiceband signal and said data signal.

1 9. The method of claim 8, wherein said act of sample slipping  
2 synchronizes said voiceband signal with said data signal.

1 10. A method of synchronizing a public switched telephone network  
2 (PSTN) clock and a digital subscriber line (DSL) clock, comprising the acts of:  
3 determining a phase offset between a voiceband signal and a data signal; and  
4 shifting one of said voiceband signal and said data signal according to said  
5 phase offset, to synchronize said voiceband signal and said data signal.